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"Measurement drives diagnosis and response": Gaps in transferring food security assessment to the urban scale

Gareth Haysom*, Godfrey Tawodzera

African Centre for Cities, University of Cape Town, Private Bag X3, Ronderbosch, Cape Town 7700, South Africa

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ABSTRACT

The understanding of food security has seen major shifts since the original conceptualisations of the challenge. These changes in understanding have been accompanied by different food security measurement approaches. Despite the fact that the world has become increasingly urbanised and the developing world in particular, is experiencing its own urban transition, changes in food security measurement remain predominantly informed by a rural understanding of food security. In instances where urban measurement does take place, rural-oriented measurement approaches are adopted, occluding critical urban challenges and systemic drivers. This paper begins by highlighting the urban transition and attendant food security challenges in the Global South. It then reflects on existing food security measurement methods, detailing the positive components but also highlighting the shortfalls applicable to the urban context. At the urban scale, a food system assessment is argued to be one appropriate tool to respond to urban food insecurity while at the same time providing both the "breadth and depth" to inform effective food security programming and policy interventions. Theoretically, questions of scale, context and a critique of the rural bias in food systems work are essential informants guiding the approaches applied.

1. Introduction

From simple beginnings at the 1943 Hot Spring Conference of Food and Agriculture, food security has become "a cornucopia of ideas" (Maxwell, 1996, p. 155). The concept of a "secure, adequate and suitable supply of food for everyone" (Weingartner, 2004, p. 4) enunciated at the conference has since been reconceptualised and expanded to meet contemporary food security concerns, perceptions and realities. Reviewing literature on household food security, Maxwell and Frankenberger (1992) listed 194 and 172 different studies on food security conceptualization and food security indicators respectively. Five years later Clay (1997) provided an additional 72 references dealing with food security conceptualizations. But why should one be overly concerned about what is measured and where? Cafiero et al. (2014, p. 230) argues that:

> Measurement is indisputably an important element of the process through which we advance knowledge. It is indispensable when we need to highlight changes such as the progress toward set targets. To contribute to knowledge and to allow correct assessments, however, measurement should be valid and reliable, posing two fundamental but distinct problems regarding what is being measured and how it is done.

The various changes in food security conceptualization have also given rise to changes in the ways in which governments and aid organizations have approached food security challenges. The initial understanding of food security as the "availability at all times of adequate world food supplies of basic foodstuffs … to sustain a steady food expansion … and to offset fluctuations in production and prices" (UN, 1975), underscored the then prevailing view that food insecurity was a function of shortages in global food supplies. Food insecurity could thus be remedied by massive food aid shipments to food deficit areas as well as increasing agricultural production (Barrett, 2010, p. 825). Food security practitioners thus paid little attention to food access issues. The persistent food crises in Africa in the mid-1980s, however exposed the myth that increased production was the panacea for food insecurity as food insecurity continued to occur even in geographic areas where food was physically available (Borton and Shoham, 1991). Through the work of Sen (1981) and his 'entitlement thesis', emphasis shifted from natural causes of food insecurity to focus on social, economic and political causes of vulnerability (Maxwell, 1996). Such reconceptualization shifted attention to individual-specific hunger; a view that served to reinforce food security strategies based on poverty reduction, food price, and social protection policies (Barrett, 2010, p. 825). These shifts

* Corresponding author.
E-mail addresses: gareth.haysom@uct.ac.za (G. Haysom), godfreyltawodzera@yahoo.com, godfrey.tawodzera@uct.ac.za (G. Tawodzera).

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inform the most widely recognised food security definition, that "food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life" (FAO, 1996). While the 1996 FAO definition remains contested, it refocused food security approaches. Food security is now seen to involve the intersection of four food system dimensions: availability, access, utilization and stability. This definition is more inclusive as it looks at whether the necessary systems, structures and policies are in place to ensure that food is available and accessible during times of extreme food scarcity (Haysom, 2017).

Parallel to developments in food security conceptualization have been advances in food security measurement. According to Upton, et al. (2015, p. 2) the primary purpose of seeking a precise and agreed upon definition [of food security] is to provide a template for understanding the problem, designing solutions, targeting policies, and assessing progress. Hence changes in food security conceptualization have also resulted in the realignment of measurements to capture the understanding embedded therein. Pre-1980, food security measurement was generally geared towards measuring availability of food stocks at national, international and global levels, paying particular attention to only those shocks that would affect production and food prices (Maxwell and Smith, 1992). The post-1980 period, heavily influenced by Amartya Sen's writings, shifted measurement emphasis to the individual's ability and ways to access food. More recent measurement developments have seen the inclusion of food preparation, utilization and feeding practices (FAO, 2008). These changes have been necessitated by the need to accurately measure food (in)security and successfully tackle its challenges. As Barrett (2010, p. 827) asserts, "measurement drives diagnosis and response". Accurate and appropriate measurement of food security is thus critical to addressing global food security challenges.

Food security measurement is both a technical and political issue. Decisions about what is measured and how it is measured is an outcome of a set of complex deliberations based on time, resources and capacities, but also on ideological and political positions. Poorly designed measurement tools obfuscate, and can have negative food security outcomes. Measurement tools designed for certain contexts can overlook vital issues in a different context. Battersby (2016, p. 1) in the context of the Sustainable Development Goals (SDGs) suggests that;

> the MDGs and SDGs fail to respond to the changing manifestation of food and nutrition insecurity with respect to the increasing urban face of food insecurity and the rapid nutrition transition that is underway in most of the developing world, and may in fact be exacerbating the newly manifesting forms of food insecurity.

The nature of measurement and how measurements are political and can be manipulated to support particular positions is evident in the case of the Millennium Development Goals (MDGs). The political bias raises questions about the "good news narrative" of the MDGs. As Hickel (2016, p. 3) states, "the narrative about poverty and hunger comprises a potent political tool". Hickel challenges more than just the measurements used, but also how data are then interpreted and communicated. The practice of aggregation, for example, often masks the reality of the net numbers experiencing food insecurity, in effect trivializing their struggles.

The daunting challenge faced in measuring food security is as a result of the multidimensionality of food insecurity. Misselhorn (2005), in her meta-analysis study of the household economy in Southern Africa, for example, identified seventeen direct drivers of food insecurity that accounted for eighty percent of the impact from thirty-three theoretical drivers. Thus, on one hand there are food security aspects that can be assessed in a quantitative manner, and on the other there are aspects that are qualitative, relating to the quality of the food consumed, and the ways in which access to such food is negotiated and experienced. With such diversity, different studies often use different measures to assess different dimensions of food security. This makes it difficult to compare results from different studies even within the same spatial and temporal frames.

Different measurement approaches yield different estimates of food insecurity at global and national levels. In June 2009, for example, the FAO estimated the number of undernourished people to have climbed to 1020 million globally (FAO, 2009). In the same month the USDA estimate of global undernutrition was only 833 million people (Shapouri et al., 2009). Arguably, politics and measurement differences were at play in these instances.

A number of authors have already advocated for a rethink on current food security measurements (e.g. Heady and Ecker, 2013; Carletto et al., 2013). The underlying arguments for the call have been that existing measurements are too varied, with different food security actors advocating for different measurements depending on their broader agenda (Carletto et al., 2013). Other authors have suggested that the variety in measurement is perhaps beneficial and question the usefulness of a single measure to determine food security status. In writing specifically on urban food security, Battersby (2012a) suggests that a suite of indicators may be able to capture the complexity and diversity of food security in different contexts. Such suggestions pose a real challenge for national governments, first where indicators and measures need to align to global reporting processes for initiatives such as the SDGs (Fukuda-Parr and Orr, 2014) and secondly, where budgets limit such "depth" in measurement.

The food security measurement debate, largely concentrating on the ability of different measures to cater for different aspects of food security as well as the comparability of such measures, has tended to mask other important measurement concerns. Such concerns centre on the contextual differences between rural and urban areas and the suitability of current measures to adequately capture the diversity that characterises the urban food security environment. This paper argues that the historical neglect of food security in the urban areas by national policy processes, urban managers, the global development fraternity, and academics, has serious repercussions for the way in which food insecurity in the city has been, and is, measured. The purpose of this paper is therefore to interrogate various measurements that have been used to assess food security, assess their appropriateness for use in urban areas and where possible, suggest modifications and additions required to measurement tools so that they are sensitive to the context in which they may be used.

2. The need for an urban food security measurement approach

Rapid urbanisation and the challenge of building inclusive cities is the critical development issue of the 21st Century, particularly in cities of the South. The absolute growth and increasing concentration of people in cities will transform governance and policy imperatives (Turok, 2012). In addition to dealing with the traditional urban challenges: housing, water, unemployment, crime, and pollution, city authorities have to brace themselves to tackle challenges relating to food security, particularly in light of the nutrition transition and rapid urbanisation in the Global South. However, food and the food security agenda have not been considered central to the urban agenda. This is despite the fact that food insecurity is an increasingly important urban problem in this millennium (Chmielewska and Souza, 2011). In the Global South, urban food insecurity has been largely sidelined in research and policy-making over the last decade (Crush and Frayne, 2011). The framing of urban food and nutrition responses remain agricultural and productionist in nature (Spoor and Robbins, 2012). This 'agro-production' focus means that the scale at which action and interventions are planned, legislated and funded remains the national scale.

The history of food security theorisation, and consequently, its measurement, has been dominated by a disproportionate focus on rural areas (Crush and Frayne, 2010). The rural focus has often been justified

on the basis that most of the poor in developing countries live in rural areas (Kay, 2016). Even the recommendations of the FAO Committee on World Food Security's (CFS) twin-track approach to combat hunger and malnutrition have a rural orientation (Crush and Frayne, 2010). The approach proposes 'designing policies to re-launch and revitalize rural economies over the medium term' (FAO, 2008, p. 43). This rural orientation is also visible in the African Union's Comprehensive Africa Agricultural Development Program (CAADP) (AU/NEPAD, 2003, p. 15), which focuses almost exclusively on the needs of rural areas by asserting the "need for an immediate impact on the livelihoods and food security of the rural poor through raising their own production". No mention is made of how the food insecurity problems of the vulnerable urban poor will be tackled. As Crush and Frayne (2010) point out, the assumption seems to be that developing rural agriculture will solve the food problems of the urban poor by reducing the cost of food. This assumption is problematic, given that urban food security involves not only food supply issues, but also issues of access and entitlements. Thus, there is need for a "greater policy focus on incomes, expenditure, markets and prices in achieving food security objectives" (FAO, 2008, p. 1) – an approach that extends beyond the rural production narrative.

The absence of research and policy focus on urban food security is based on the view that urban residents are better off economically. This view, however, is erroneous given Illife's (1987) ground-breaking work on African cities which showed that poverty is endemic in urban areas. Furthermore, Rice and Rice (2009, p. 1) present evidence of an "urban penalty" wherein poor urban dwellers exhibit poorer health outcomes when compared to rural populations. In the city, poverty generally entails living with multiple and cumulative deprivations in an environment characterised by inadequate social security mechanisms; an almost exclusive reliance on a cash economy and fluctuating prices of basic goods and services (Wratten, 1995). For the urban poor, such circumstances are likely to have negative food security outcomes, particularly because food access is enabled through entitlements rather than production. Where there is a realization of the urban food security problem, much of the work uses assessment methods and tools specifically designed for rural areas. Criticisms of urban poverty measurements apply to urban food security, Satterthwaite (2014) and Lucci et al. (2016), have argued that the levels of urban poverty are consistently under-estimated on the basis of indicators that have been translocated from rural to urban areas without taking into account contextual differences where higher incomes are required to survive in the city.

The majority of the rural food security assessments and approaches have also generally focused at the individual and household scale (Leroy et al., 2015). This focus has been shown to be inadequate in the city. The household level focus, which is based on the assumption that households consume from "the same pot" misses the urban phenomenon of meals consumed away from the household (Lucci et al., 2016: 17). The household focus also does not interrogate problems that are caused by the wider food system (Battersby, 2012a). Households with the same income, but living in different areas, for example, may experience different food security levels because of other factors such as differential access to food sources and different prices of food in different geographic areas (Battersby, 2011). In urban areas there is need for measurements that recognise that food security at the household level results from an interplay of several factors at different scales.

In addition, this paper also contends that to effectively measure and assess food security in urban areas, one should be able to select the right methods that allow for the "estimation of prevalence, the identification of causes, a better targeting of high-risk population groups, and the establishment of reliable monitoring and evaluation systems" (Frongillo, 1999, p. 507S). Such measures should enable greater certainty of what is being measured; allow for the application of mathematical techniques for verification of validity; facilitate subtle discriminations and correspondingly more precise descriptions; be relevant, credible, time sensitive, cost effective and also be comparable across locations and cultures (De Cock, 2012). This is important because if food (in)security cannot be accurately measured, it is difficult to see how it can then be effectively remedied. Without the correct information, planned interventions run the risk of poor targeting, hence undermining the impact of the intervention. Effective food security interventions in cities of the Global South should thus stem from correct measurements of the nature and scale of the problem. Two key conceptual strands inform the arguments in this paper. The first is how food security is framed and the second concerns the nature and scale of urbanisation.

This paper adopts a distinct Southern urban orientation to the issues of food security and food security measurement. Urbanisation in the Global South differs from earlier, generally Northern, urbanisation processes (Pieterse, 2013). Southern cities present unique characteristics as they are generally characterised by growth without formal sector employment, infrastructure and services for the poor (Essex, 2016). This is often referred to as the second urban transition (Pieterse, 2013). These differences present different governance challenges associated with resource limitations and governance capacity (Pieterse et al., 2015) and scale tensions (Haysom, 2015). This Southern focus does not discount the fact that Northern cities face similar challenges. Urban and broader regional scales in the North have responded to food system challenges through a variety of interventions. These actions range from direct city specific policies to more pluralistic governance structures (see Haysom, 2015) aligned to notions of alternative food networks (Renting et al., 2003) or geographies (Wiskerke, 2009), or more broadly, food policy councils (MacRae and Donahue, 2013). While there may be some similarities in Northern and Southern urban food system approaches (e.g. food deserts and urban agriculture food security responses), Battersby (2012b) motivates for theories and concepts that are grounded in the understanding of the cities of the Global South because of contextual differences.

The need for different measurement approaches between rural and urban areas becomes apparent when one considers the various food security dimensions of availability, access, utilization and stability. Urban concerns with availability and access are quite different to those of rural areas, as are questions of stability. Evidence of these differences are seen in how months of limited food access are reported in the African Food Security Urban Network (AFSUN) surveys carried out in predominantly poor areas of eleven African cities in 2008. In Cape Town, the months of greatest food need aligned more directly to increases in costs of transport and heating fuel and not seasonal fluctuations (Battersby, 2011). The ability to manage monthly food access challenges relied on thick networks within tightknit community structures (Battersby, 2011). These points were reinforced in later work in Lusaka where saving clubs and a wide network of city-related livelihood processes enabled greater reported food access (Davies, 2016). The next section discusses the different food security measurement approaches, detailing their benefits and limitations.

3. Food security indicators and measurement

Measurements of food security have been the subject of much debate (Battersby, 2012a; Masset, 2011). By its nature, measurement is inherently political as it determines the subsequent actions that flow from findings. The ultimate anticipated utility of measurement findings often determines the measurement approach. This is perhaps best demonstrated through the practice of indicator led development, for example, the MDGs where indicators are used to report on developmental progress. The MDGs (and later the SDGs) resulted in development being determined by the composition and structure of the indicators (Fukuda-Parr and Orr, 2014). Broader development aims were not effectively assessed (Battersby, 2016, p. 6), neither was planning towards achieving the targets. The indicators effectively nullified the complexity of the specific developmental issues (Fukuda-Parr and Orr, 2014, p. 147) as well as "definitional issues, varying local realities, and varying

practices of data collection" (Simon et al., 2016, p. 4).

Recorded and documented at a global scale, but referencing national scale development indicators, indexes such as the Food and Agricultural Organisation's FAO Index (FAO, 1987) and the International Food Policy Research Institute (IFPRI) Global Hunger Index[1] offer insights into the national state of food security. UNICEF uses proxies to generate a composite food insecurity rating for comparison at a global scale, using national anthropometric data in their annual State of the World's Children report series (UNICEF, 2014). All such measures are of value when generating national food security data, or for comparisons between countries. The challenge is that the politics of reporting to an international audience generally determines the measurement approaches applied. In the Global South, where budget allocations are limited, such measurements are often the only food and nutrition measurements applied. This has profound consequences for the local and specifically urban scale challenges (Simon et al., 2016).

Macro-scale measurements and the associated politics that informed such measurements infuse national food security policy and programming (see Drimie and Ruysenaar, 2010 as an example). The consequence of this is that targeting is often misaligned. A South African example highlights the consequence of the merging of politics and aggregation of data for reporting. In this case aggregated data used meant that the most acute food insecurity was assumed to be present in certain rural areas - as a result of high percentage scores (but low net numbers). This resulted in food security programming and fiscal allocations directed to agricultural production and rural development, this in a country that is over 60 percent urbanised and where the net numbers of citizens experiencing food insecurity were significantly higher in the urban centres, and in a country whose food system reflects a largely urban food system.[2] When assessing food insecurity for the purpose of strategic planning and proactive responses, context and scale are therefore of critical importance (Wiskerke, 2009), a fact that is true for other development interventions (Essex, 2016). For food security, this is particularly prevalent in the developing world, where urban food security is one of the greatest policy omissions (Crush and Frayne, 2010) and of particular importance when development challenges of African cities are considered (Pieterse et al., 2015).

Therefore, the high levels and persistence of food insecurity in urban areas (Cohen and Garret, 2010), coupled with developing world urbanisation requires an interrogation of measurement approaches most generally used. Such an interrogation needs to pay particular attention to the adequacy of nationally generalised composite and proxy food security measures as these are the measures most used to determine policy and programming (Carletto et al., 2013; Fukuda-Parr and Orr, 2014; Masset, 2011).

The food security focus is compounded by a further conceptual 'blind spot', evident in how a number of different terms are used to indicate food insecurity. It is common to find food insecurity being equated to hunger, or at times, starvation. This directs the food security issue away from its multi-dimensionality, returning to the limiting availability (production) question (Hendricks, 2015). The inappropriate use of terms such as nutrition, obesity and even vulnerability as sole indicators of food security has consequences. Firstly, while all are features of food insecurity, these cannot be used as sole indicators of food security. Secondly, a focus on hunger and famine diverts attention to issues of disaster relief, production support and social protection. Such foci miss other urban food transitions taking place such as food consumption changes and the rise in non-communicable diseases across all sectors of society as well as dietary related challenges often not associated with rural food availability (Smith, 2013).

Assessments also need to be able to provide information on more than just the household, offering insights into the wider food system issues specific to the scale of enquiry and governance.

> And attempt to lift the urban issue … beyond the depoliticized household scale development focused work and reconnect with wider social, political, economic, and spatial processes
>
> Battersby, 2013, p. 457

Policies and response strategies informed by data generated at an inappropriate scale and through inappropriate measurement tools can result in inappropriate responses. Evidence of scalar disconnects in policy and concerns over broad generalisations are not unique to the food security field. Over 10 years ago, in the context of the social determinants of health, for effective policy and programmatic responses, Labonté and Schrecker highlighted the importance of:

> Rely[ing] on evidence generated by multiple disciplines, research designs and methodologies … comprising both qualitative and quantitative findings. Issues of scale are also relevant … the need to integrate work using different units of analysis (e.g. the household, the region, the national economy) in order to describe relevant mechanisms of action in sufficient detail, and to reflect intra-national disparities (e.g. by region, class and gender) that are not apparent from national level data
>
> Labonté and Schrecker, 2007, p. 6

The following section gives an overview of a selection of food security measurement approaches. It then considers the indicators generated as well as their importance for different operational outcomes and reporting purposes.

4. Food security measurement approaches

Measuring food security is complex. The multi-dimensionality of food security makes it technically complicated to develop a single index that captures all aspects encapsulated in the food security concept. A composite measure of food security therefore does not exist (Carletto et al., 2013). Measuring food security requires the use of different measures to capture the different dimensions of food security (Ballard et al., 2013). Food security is generally measured at the household or individual scale – as this is where food consumption is assumed to take place. However, many of the drivers of food security are not identifiable through household scale analysis alone (Battersby et al., 2014).

Different approaches are used to measure food security. These approaches can be categorized broadly as anthropometrics, direct household tools, and proxy tools. More recently, new systems-oriented tools such as food system assessments, have started to emerge. Each measurement approach has benefits and deficiencies (see Table 1). Deficiencies are often driven by the complex relationship between food availability, market mechanisms, environmental conditions, seasonality, politics, conflicts, inequality, and a host of other factors. As a result, the constant challenge that plays out is one of trying to prioritise the on-going questions associated with the "the breadth-versus- depth trade-offs" (Barrett, 2010, p. 828).

Three themes are evident in the historical evolution of measurement approaches. The first follows the sufficiency logics emerging out of the food crises in the early 1970s. Second, following Sen's (1981) seminal work, measurement approaches began to include the individual and the household access to food. Third, is the emergence of measures that view food beyond production and the market, to include cultural dimensions, as well as less tangible concerns, such as anxiety about food shortage. A fourth theme is emerging. Given the multi-dimensionality of food security, a nascent approach is the food system assessment. This approach draws on multiple measurements and other information, and attempts to facilitate more holistic responses.

The development of anthropometrics, direct household tools, and

[1] See: http://www.ifpri.org/topic/global-hunger-index.

[2] See https://www.dropbox.com/sh/47i88hizztx2pvm/AABREh6dwQfHtmGQxuSp0zeGa?dl=0 for a more detailed description of the challenges associated with aggregated data and the politics of food.

Table 1
Summary of food security assessment methods.
Source: Battersby et al., 2014; Bashir & Schilizzi, 2013; De Cock, 2012

Method/Indicators	Description/Principles	Advantages	Weaknesses
Anthropometry	**Input**: Weight, height, body size, & other information on food provisioning, preparation, composition of food & consumption **Output:** Proportion of population that is malnourished	The highly standardized measurements of weight & height are vastly reproducible across individuals Mapping of nutritional security can be done at both national & local levels Evidence-based cut-off points	Requires a lot of time to conductMeasures food security indirectly (since the indicator result from the interaction of food security & health status) (Nutritional health indicator) Generally expensive
Household Expenditure Surveys (HES)	**Input:** Household information on expenditure of food & other necessities **Output**: Caloric intake per capita per household	Flexible-allows for mapping of determinants at local & national level Dietary quality data can help understand the food security dimensions	Measures available amount (ignores consumed amounts at given time-frame) Does not account for amount of food consumed outside the home Conversion of available food to caloric intakes involves major assumptions that can cause measurement errors Does not collect data on food wasted
Coping Strategy Index	**Inputs:** questions on how households are responding to food shortages **Outcome:** how households are responding and/or adapting to the presence or threat of food shortages	Uses simple questions that are easy to understand & implement Captures directly the notion of adequacy and vulnerability	Comparison across households or localities is problematic, (poorer household tend to report smaller quantities) Can be misleading (both richer and poorer household may report smaller portions, but is does not imply an equal increase in food insecurity)
Food Insecurity Experience-Based Measurement Scales (FIEMS) **(HFIAS; HFIAP; MAHFP; HFSSM)**	**Input:** Scale containing items representing the conceptual and multidimensional nature of food insecurity. Algorithm to convert scale scores into Food Insecurity categories Output:	Measures the phenomenon of food security according to individual experiences Captures the psychosocial dimensions of food security along with physical experiences Valid across varied socio-cultural settings Can be used for mapping that leads to better understanding of causes & consequences of food insecurity	Difficult to generalize across different cultures Difficult to establish cut-off points for classifying households into different levels of food security Does not capture food safety dimension Different reference time periods and frequency response options needed in different settings
Dietary Intake Assessment (DIA) **(DDS; FVS; FFS)**	**Input:** Different items consumed by individual/household in a specific period (24 h/7 days) **Output**: Sum of the different foods consumed by individual/household over a specific time period	Measures consumption directly (and not availability) Addresses both dietary quality & caloric intakes at individual level Can be asked of individuals as well as households Useful to understand recent and longer term dietary intake Possible to understand intra-household food security levels	Rely heavily on respondent's memory –can lead to measurement error Assessment of adjusted recall estimates is a very difficult task that may lead to high measurement errors Simple form of the measure does not report quantities Needs experienced researchers to interview respondents

proxy tools all have a distinct genealogy, often emanating from the particular framing of food security in a particular context, or at a given time. Detailing this historical evolution in processes is beyond the scope of this article. The works of Coates (2013), Jones, et al. (2013) and Ballard et al. (2013) however, provide detailed historical accounts of the evolution and variants in food security measurement.

Anthropometry focuses primarily on the individual, providing evidence of the proportion of the population that is malnourished (de Onis, 2004). This measure collects data principally on child weight-for-age, a measure of underweight, and height-for-age, a measure of stunting. This has relevance as food security is closely correlated to the nutrition status of children (Mukhopadhyay, and Biswas, 2011). A drawback of anthropometry is that the relationship between food security and underweight and overweight is complex, presenting problems when using anthropometric measures as proxy indicators for household food security. Additionally, anthropometric measurements require time and are costly to administer.

The next basket of measurements, food insecurity experience measurement scales (FIEMS), measure the phenomenon of food security according to individual experiences, capturing both the psychosocial dimensions and physical experiences of food insecurity and can be valid across varied socio-cultural settings. However FIEMS present challenges when generalising across different cultures and once the data is collected, it is difficult to establish cut-off points for classifying households into different levels of food security (De Cock, 2012). The authors question the primacy afforded to these measures in policy programming, and even their adequacy at the urban scale. The measurements within the FEIMS include the Household Food Insecurity Access Scale Indicator (HFIAS), the Household Food Insecurity Access Prevalence Indicator (HFIAP), the measure used to categorise households into four levels of household food security and the Months of Adequate Household Food Provisioning (MAHFP), which captures a longer recall of food security challenges (Coates et al., 2007; Swindale and Bilinsky, 2006)

Falling within the broad categorisation of proxy tools are the Household Expenditure Surveys (HES), the Coping Strategy Index (CSI) and dietary intake measurements. These all measure a specific indicator and use the data generated as a proxy to determine levels of food security. HES are measures of food security generally drawn from national census or household survey data. Food security ratings are generated from household expenditure on food and other necessities over a given reference period (Smith and Subandoro, 2007). Information on expenditure is used to determine dietary quality generating a general understanding of the food security dimensions. The HES process of converting potential available food to caloric intakes involves assumptions that may not be representative of actual practice (Bashir and

Schilizzi, 2013). Drawing on work in India, Smith (2013) offers a useful critique of the HES measures, suggesting that they fail to adequately capture contemporary food system transitions. When coupled with potential data challenges, the interventions that result are significantly flawed.

The CSI is a methodology applied to counter the absence or inaccuracy of figures for income, expenditures and production at the household level. This CSI measures the *frequency* of household coping behaviours and the *severity* of such behaviours (Maxwell et al., 2008, p. 534). These measurements are then combined into a single score (Abdallah et al., nd). The CSI directly captures inputs on adequacy and vulnerability. The CSI does not distinguish between pre-crisis and crisis-driven coping strategies, while also relying on reporting from different income categories who may report severity in different ways.

A variety of measurements concern themselves with dietary intake as an indicator of food security. These include the Dietary Diversity Scores (DDS), the Food Variety Scores (FVS), and the Food Frequency Scores (FFS). Dietary diversity indicators are effective food and nutrition security proxy indicators (Heady and Ecker, 2013). An association exists between dietary diversity scores and nutrient adequacy (Ruel, 2003), correlating with factors such as household income (Swindale and Bilinsky, 2006). The drawback of the dietary measures is the failure to effectively consider food that has been consumed outside the home (e.g. at school or at work, or on route to such) and the reliance on recall, which can result in measurement error (Battersby et al., 2014).

In addressing food security, if measurements are to generate solutions that work it is necessary to understand household food security in the context of the wider food system (Battersby, 2016; Rocha and Lessa, 2009). This calls for a wider and more encompassing approach to measurement. One such approach is the food system assessment approach (Winne, 2005).

In a food system assessment, all the components of the food system are analysed and evaluated in order to understand their functionality, competitiveness, as well as to identify existing assets and gaps within the system. This enables food system planners and policy makers to understand the connections that exist (or are absent) between food system mechanisms and outcomes (food insecurity, under or over nutrition, etc.). There is no universal food system assessment measure. Each food system operates at a different scale with different food system actors, vulnerabilities and strengths (Rocha and Lessa, 2009). This requires detailed planning and often entails an iterative process of refinement and development. Dahlberg (1999, p. 44) provides insights into possible areas of food system analysis. These include the overarching themes of: firstly, a focus on contextual issues, and, secondly, focusing on food system leadership. This is then followed by detailed analysis into key food system issues such as food security, nutritional status and market structures. A comprehensive food system assessment not only identifies the *needs* of a community but also provides an *understanding* of the context and dynamics that have led or are leading to a crisis (IFRCS, 2007). Periodical food system assessment further facilitates the tracking of progress within the identified problem areas (Pothukuchi and Kaufman, 2000). Food system assessments thus include various food security measurement findings with a contextually informed collection of other data and knowledge.

5. Discussion

There is a growing body of work questioning various forms of assessment at the urban scale. This critique includes poverty assessments, arguing that as a result of the functioning of the urban system, urban poverty assessments undercount the scale of poverty (Lucci and Bhatkal, 2014; Mitlin and Satterthwaite, 2013). Not only is poverty poorly conceived, defined and measured in urban areas, but poverty measurements often fail to account for the real costs of living in urban areas (Mitlin and Satterthwaite, 2013). Critiques of measurement at the urban scale are not unique to poverty measures. Essex (2016) demonstrates the broader development challenges faced by international agencies when operating in urban areas.

While not speaking specifically about urban measurements, but on social determinants of health, Labonté and Schrecker (2007) called for far greater engagements with scale, particularly the scale at which measurement and subsequent policy are enacted. Similar critiques can be applied to understanding and measuring urban food security. There are many reasons for a lack of measures focused at the urban scale specifically. While not exhaustive, four general domains are identified as factors that contribute to the urban food security measurement oversight. The first, contrary to certain theoretical arguments, is not the urban bias, but rather rural bias (Crush and Frayne, 2011). Secondly, the scalar blind spot in the current food security measurement practices, a blind spot that is further amplified in the urban context. Third and fourth are the linked challenges associated with deliberate abstracting processes, particularly in terms of what is in fact measured and then the politics associated with measurement.

The extent and pace of urbanisation in the Global South makes a specific urban focus all the more urgent. Uncritical assumptions and poorly informed understandings about the state of food security has serious consequences for how policies are constructed, how resources are allocated and how governance actors at the urban scale view their role in responding to food insecurity and their resultant actions in the wider urban food system. The long-term consequence of neglecting urban food security means that communities face, and will continue to face, considerable developmental (and even rights related) challenges.

There are a number of reasons for the urban blind spot in how measurement has been approached and the broad generalization of the programming and planning of food security measurement. The first is the rural bias, particularly in food security discourses and approaches. Linked to the rural bias and the resultant “ruralisation” of food security is that despite long-standing acceptance of all four dimensions of food security in theory, in practice the production perspective remains dominant, itself reinforcing a rural orientation. While there are similarities in how food security is experienced in rural and urban areas, there are additional food security dynamics encountered in urban areas that require inclusion in food security measurement. Linked in part to the rural bias is the complete under-appreciation for the scale and nature of urbanisation in the Global South. This has implications for food security and food system challenges, particularly because the potential negative consequences of the urban transition are further amplified by issues associated with the food system-related transitions (McMichael, 2009), financialisation (Greenberg, 2016), the nutrition transition (see Rocha and Lessa, 2009), and other food related transitions (ecological, financial, climatic) that directly impact the urban scale.

The scalar blind spot is of particular importance when questions of urban food security measurement are considered. The national scale measurement of food security often linked to the sufficiency question, both in terms of production and even calorific consumption of net calories, while still present, has been broadened to now include questions of food access, utilization and stability. Food access (in broad terms) is the key measurement indicator in FIEMS, HES, CSI and DDS measurement approaches. These measurements however focus on either the individual or household scales. The wider neighborhood or urban scale of measurement remains absent. This oversight remains present in the current critiques of measurement. For example, in their critical review of food security measurement Jones et al. (2013) offer no comment on the absence of the “missing middle” measurement domain between the household and the national scale. Coates’s (2013, p. 188) work describes the advances in household measurement tools noting “marked incongruities persist between the internationally recognized definition of food security and the way it is applied through both measurement and policy” but the debate again misses and engagement in the scale between the household and nation state.

The uncritical use of FIEMS, HES and CSI indicators as the sole

informant in policy and programming at the urban scale fails to adequately consider the lived food geographies of the urban poor. Arriving at a determination of the level of food security informed by assumed food consumption only (both in terms of quantity and cost) misses significant costs (both monetary and relational) associated with the practice of acquiring that food, costs other than food expenses. An example is on how increased costs of energy can alter the quality of the food consumed. This impacts food security status. While always context specific, in any food and income assessment, it is essential to understand that a number of urban residents eat meals, particularly their main meal, outside the home. The "home' is a key measurement focus of the FIEMS and HDDS instruments. The conclusion drawn, informed by surveys on urban food consumption (Beegle et al., 2012) is that urban food consumption is under- estimated, raising questions about the stated levels of food insecurity in urban areas. Urban form, land value and the state of infrastructure all impact on the cost of living, and on what, and how, food is consumed.

The absence of engagement in the urban scale, or even a sub national regional scale confirms this blind spot not only in practice but also in terms of how food security measurement has, and remains, conceptualized. In light of the primacy given to city regional food systems in the emerging New Urban Agenda and even Sustainable Development Goals (SDGs), this raises critical questions about what has informed these uncritically adopted perspectives, particularly when viewed through a Southern and developmental lens. Reporting to global measurement and data aggregating processes, such as the SDGs, further undermines measurement at the urban scale.

Limited budgets, over simplified and broadly generalized indicators and proxies used to inform an understanding of food security is a form of abstracting that has highly problematic consequences (see Fukuda-Parr and Orr, 2014). This is of particular concern given the transition to the SDGs and a key development indicator. The current SDG indicators and the absence of any relevant engagement in the urban scale in the hunger/food goal (SDG 2) and even less engagement in food in the urban goal (SDG 11), limits any proactive urban food security measurement engagement at the urban scale. Given the limited budgets of countries of the South and the importance placed on reporting on SDG targets, there is a real risk that measurement associated with or linked to the SDGs could become the only measurements applied. The consequence of this is that it will be these SDG aligned measurements that inform policy. Such risks are potentially amplified when global NGOs and development agencies engage poorer countries with SDG aligned support, particularly funding, driving focus away from the urban scale. This is an issue with the SDGs but it is not just through the SDG process that abstracting has potentially negative consequences. More generally, abstracting means that deliberate decisions are being taken about what, where and how measurement takes place.

Measurement is inherently political. The risks for any state, government or accountable authority associated with a regression in development outcomes are high. Attempts to access detailed census data, other than that published in national publications, remain a challenge in many African cities. This is not just an administrative issue. Rather there are distinct embargoes placed on what and how information is released. When such data is released, it is often in a form that masks actual challenges. Battersby et al. (2014), using the South African case, show how food security outcomes (acquired via the HES measure) are aggregated to the provincial scale and then reported as percentages and not net numbers.

> Approximately 6.1% of Gauteng's 1,964,168 households spent R600 or less per month compared to 21.7% of the Northern Cape's 186 984 households. Although the Gauteng proportion is far lower, this equates to 119,814 households compared to 40,575 households in the Northern Cape, a predominantly rural province. As a result of the use of percentages and not actual numbers the policy (and aligned fiscal) response was directed towards rural food security initiatives.
>
> Battersby et al., 2014: 28

Politics is linked to reporting to global governance institutions as well as being linked to how indicators are reported to citizenry. Politics and arguably the associated importance of broad and comprehensive measures of food security can be deemed secondary to other needs. However, the multi-dimensionality and multi-scalar nature of food security means that for development interventions to achieve the required outcomes, expanded but also, contextually relevant food security measurement approaches are required. This is not just about access to food, but also about cities now and into the future. It is increasingly evident that urban areas are experiencing the triple burden of malnutrition, with undernutrition, micronutrient deficiencies, and overweight, obesity and associated diet-related non-communicable diseases co-existing in households (Gómez et al., 2013). These transitions require new forms of assessment and governance. The "breadth-versus-depth trade-offs" (Barrett, 2010, p. 828) is argued here to be something of a red herring. Both are required and without both, the responses will remain projects and will not generate long-term systemic change.

Two aligned shifts are required when urban food security is measured. Firstly, the assessment tools, whichever are applied, need to be fundamentally reworked in order to effectively capture the urban food security dynamic. This requires both theoretical shifts, as highlighted in the gaps in the Lucci et al. (2016) food/poverty conclusions, but also practical engagement in how communities engage with the urban food system. Such shifts demand an acceptance of the fact that in a predominantly urban world, food security is not about production, but rather a collection of a far wider set of issues. This requires not only changes in, but also additions to, the measurement questions. Secondly and administratively more challenging, food security measurement challenges the silo-ed departmental functioning of local government at the city scale. As many of the drivers of food security are not identifiable through household scale analysis alone, a far wider assessment of the drivers of food insecurity is required. This requires a strategic approach that engages the wider urban system and the broader food system. Here a contextually driven food system assessment is required. As Haysom (2015, p. 264) suggests "city-wide strategies elevate food security responses to strategies and processes that consider wider urban food system perspectives".

Despite political resistance to decentralised food security measurement and resultant interventions coupled with the dominance of rural production perspectives, the urban scale is an increasingly important political and developmental domain. New approaches in how these scales are understood and governed are required. Food system assessments are emerging as one particular way in which the multi-dimensionality of food security can be effectively assessed, measured and then programmed into policy. The use of food system assessments as a tool to engage food security issues at the urban scale is argued here to have benefit, firstly because the practice of understanding the food system and food security issues in a more holistic manner can serve to inform changes that are essential in the current food security measurement approaches. Secondly, by their very nature, food system assessments draw on knowledge from a wide variety of sources, not just single surveys or proxy indicators. This draws many other knowledge domains into the policy space. The complimentary nature of the food system assessment does not mean that the urban scale defects in the current food security measurement approaches are countered and no further action is required. On the contrary, the food system assessments also become the tool to drive changes in measurement, informed by evidence derived via the assessment about the functioning of the food system at a particular scale.

Such strategies may not offer the requisite data required to inform global reporting initiatives. How these align within the targeted (2030) reporting cycle remains a further question. However, what is of critical development related importance is the generation of policies and

programmes informed by appropriate data. The consequences of the multiple intersections associated with the urban transition in the South, wider food system and nutrition–related transitions and the long-term developmental consequences, all reinforce the urgency in approaching urban scale food security measurement in very different ways.

Despite budgetary limitations and operational reluctance to engage the food system at the urban scale, the ultimate savings (for example in children in the first 1000 days being able to achieve their full potential) and societal benefits, arguably outweigh the current reluctance to engage these issues. Understanding the urban food security realities however, remains the critical challenge.

6. Conclusion

Despite the FAO's recognition of the need to change measurement approaches (FAO, 2012), practice remains largely unchanged. This paper has argued that while some innovation in measurement is evident, food security status reporting to global organisations from a national scale perspective dilutes the resolution required in food security measurement and subsequent programming at the urban scale.

The contextual experiences of food insecurity demand different food security assessment approaches. This brings into question the appropriateness of national measurements used to inform food security policy at other scales.

Here the depth versus breadth question becomes irrelevant as breadth is essential, a non-negotiable, and depth needs to be generated through the process of constant iteration and engagement. The likelihood of collaboration between society and the state and between different administrative silos within the state is highly doubtful at the national scale. Experience from Northern food system approaches indicates that urban scale offers far greater opportunities. Questions of scale, context and history are essential informants guiding the approaches applied.

Politics matter and play out in a number of ways. A lack of understanding of the urban food system challenges and functioning has led to technical weaknesses in measuring food insecurity, but these weaknesses in measurement are reinforced by ideological and political positions that validate such choices. This has direct bearing on urban food security measurements. Reporting to international bodies carries prestige. The rural bias remains clearly evident in country-scale strategies and in donor and developmental programming. Cities in the Global South are developing rapidly; so-called secondary cities are growing even faster. The developmental challenges associated with poorly targeted food security programmes will have lasting consequences. Food connects many urban functions. In a rapidly urbanising environment, one where the nature and functionality of the urbanisation processes presents its own challenges, the urban scale is an essential area requiring food security assessment focus. What is required is a different scale of assessment, one that draws on the realities of the individual and the household but then integrates these issues with other food system and urban structural issues at scales that extend well beyond the household. Here the importance of urban-specific food security measurement tools and urban scale food system assessments are argued to be essential, stressing the need for a very different approach to food security measurement and subsequent response programming at the urban scale.

City managers, food system actors, urban political actors have a far greater role to play in the rapidly transforming urban food systems of the South. National and urban policy needs to embrace such changes. The increasingly negative food security indicators at the urban scale mean that this is an area requiring drastic attention. This attention has to engage the issue from the city scale, not a top down uniform national policy response, but without absolving other spheres or scales of government of their responsibility to the wider development project. The urban context, the multi-dimensionality of food security and the rate of change, all mean that single measurement approaches are no longer adequate.

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